

polysaccharide is characterized in that it exhibits an effective initial Absorbency Under Load (AUL) value and exhibits an effective stability in its absorbent properties after aging.

One embodiment of the present invention concerns a carboxyalkyl polysaccharide that exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of its initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

The present invention further concerns methods for producing a water-swellaable, water-insoluble carboxyalkyl polysaccharide that exhibits an effective initial Absorbency Under Load value and exhibits an effective stability in its absorbent properties after aging.

One method of the present invention comprises the steps of preparing a mixture comprising a water-soluble carboxyalkyl polysaccharide, water, and a crosslinking agent. The carboxyalkyl polysaccharide is recovered from the mixture and heat-treated at a temperature for an amount of time effective so that the carboxyalkyl polysaccharide exhibits an effective initial Absorbency Under Load value and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises forming a mixture comprising a water-soluble carboxyalkyl polysaccharide, water, and a crosslinking agent; recovering said carboxyalkyl polysaccharide from said mixture; and heat-treating said recovered carboxyalkyl polysaccharide at a temperature above about 50° C. for a time effective to crosslink said carboxyalkyl polysaccharide to render said carboxyalkyl polysaccharide water swellaable and water insoluble, wherein the water-swellaable, water-insoluble carboxyalkyl polysaccharide exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of the initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

Another method of the present invention comprises the steps of preparing a mixture comprising a water-soluble carboxyalkyl polysaccharide and water. The carboxyalkyl polysaccharide is recovered from the mixture and heat-treated at a temperature for an amount of time effective so that the carboxyalkyl polysaccharide exhibits an effective initial Absorbency Under Load value and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises forming a mixture comprising a water-soluble carboxyalkyl polysaccharide, and water; recovering said carboxyalkyl polysaccharide from said mixture; and heat-treating said recovered carboxyalkyl polysaccharide at a temperature between about 200° C. and about 250° C. for an amount of time between about 50 to about 90 seconds, wherein said heat-treating is effective to crosslink said carboxyalkyl polysaccharide to render said carboxyalkyl polysaccharide water swellaable and water insoluble, wherein the water-swellaable, water-insoluble carboxyalkyl polysaccharide exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of the initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

Another method of the present invention comprises the steps of preparing a mixture comprising a water-soluble carboxyalkyl polysaccharide and water, wherein the mixture has a pH between about 4.0 and about 7.5. The carboxyalkyl polysaccharide is recovered from the mixture and heat-treated at a temperature for an amount of time effective so that the carboxyalkyl polysaccharide exhibits an effective

initial Absorbency Under Load value and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises forming a mixture comprising a water-soluble carboxyalkyl polysaccharide and water, wherein the mixture has a pH between about 4.0 and about 7.5; recovering said carboxyalkyl polysaccharide from said mixture; and heat-treating said recovered carboxyalkyl polysaccharide at a temperature above about 50° C. for a time effective to crosslink said carboxyalkyl polysaccharide to render said carboxyalkyl polysaccharide water swellaable and water insoluble, wherein the water-swellaable, water-insoluble carboxyalkyl polysaccharide exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of the initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

Another method of the present invention comprises the steps of preparing a mixture comprising a water-soluble carboxyalkyl polysaccharide, citric acid, a catalyst, and water. The carboxyalkyl polysaccharide is recovered from the mixture so that the carboxyalkyl polysaccharide exhibits an effective initial Absorbency Under Load and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises forming a mixture comprising a water-soluble carboxyalkyl polysaccharide, water, citric acid, and sodium hypophosphite and recovering said carboxyalkyl polysaccharide from said mixture, wherein the water-swellaable, water-insoluble carboxyalkyl polysaccharide exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of the initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

Another method of the present invention comprises the steps of forming a mixture comprising a water-soluble carboxyalkyl polysaccharide, an aluminum ion, and water. The carboxyalkyl polysaccharide is recovered from the mixture so that the carboxyalkyl polysaccharide exhibits an effective initial Absorbency Under Load and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises forming a mixture comprising a water-soluble carboxyalkyl polysaccharide, water, and a crosslinking agent comprising an aluminum ion and recovering said carboxyalkyl polysaccharide from said mixture wherein the water-swellaable, water-insoluble carboxyalkyl polysaccharide exhibits an initial Absorbency Under Load value of at least about 14 and retains at least about 50 percent of the initial Absorbency Under Load value after aging for about 60 days at about 24° C. and at least about 30 percent relative humidity.

Another method of the present invention comprises preparing a carboxyalkyl polysaccharide in a reaction dispersion, recovering the carboxyalkyl polysaccharide from the reaction dispersion, preparing a mixture comprising the recovered carboxyalkyl polysaccharide and water, and recovering the carboxyalkyl polysaccharide from the mixture wherein the carboxyalkyl polysaccharide comprises an amount of the original crystalline structure of the polysaccharide to be effective so that the carboxyalkyl polysaccharide exhibits an effective initial Absorbency Under Load and exhibits an effective stability in its absorbent properties after aging.

One embodiment of such a method comprises:

- a. preparing a reaction dispersion comprising a solvent and a polysaccharide comprising an original crystalline structure;